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nial injection (the most deadly method), death does not result, but the animal acquires an immunity from hydrophobia. (2) If, on the other hand, the poison of rabies be cultivated in successive rabbits or guinea-pigs only, its potency is intensified, and after a time is so great that a fatal issue invariably follows its inoculation. The poison as found in the dog is intermediate in strength between that of the two methods of cultivation just mentioned. Thus by careful selection of the medium and the stage of cultivation, it is possible to accumulate a store of attenuated virus which can be relied on to communicate a modified rabies whose inoculation shall be protective against its severer forms, as that of vaccinia is against variola. There is also good reason to believe, though the actual experiment is postponed, that, as with vaccinia, the modified poison hypodermically engrafted immediately after the bite of a rabid animal, will forestall, by the speed of its development, the symptoms due to the bite. No experiments have as yet been made on the human subject. (*Progrès Médical*, May, 1884). The experiments which M. Pasteur is reported thus far to have made are said to be an unbroken success. Fifty-seven dogs have been the subjects of investigation. Of these, nineteen were rabid, and by these, thirty-eight healthy animals were bitten under uniform conditions. Of the thirty-eight, one-half the number had been previously inoculated or "vaccinated" with attenuated virus, the other half had not. The latter, without a single exception, died with unequivocal signs of rabies, whereas the nineteen others remain as well as ever. They will be watched for a year by veterinary surgeons to see whether the inoculation holds good permanently or only temporarily. If rabies be not spontaneous in its origin, and if the experiments of Pasteur all turn out successful, there seems no reason why canine madness should not be extirpated from our midst.—*Lancet*, July 12, 1884.

PSYCHOLOGY.

CLEVENGER ON THE EVOLUTION OF MIND AND BODY OF MAN AND ANIMALS.¹—We have here a work, scientific and speculative, on several of the live questions of the day. The author is an evolutionist physical and metaphysical. More than this, he is a mechanical evolutionist, and endeavors throughout the book to prove the origin of structures through use and effort, and their loss by disuse. The especial object of the discussion is to demonstrate the origin of mind and its various departments by the action of its material basis. From this process he does not exclude consciousness as a necessary factor. When he comes to the origin of consciousness, the author writes as follows (p. 18): "The amœba's functions are simple, but nevertheless the same as

¹ Comparative Physiology and Psychology, by S. V. Clevenger, M.D., Chicago, Jansen McClurg & Co., 1885, pp. 247.

our own. Forthwith we must assign it a desire for food, which desire is the chemical affinity of atoms; then the *Amœba* hungers." The origin of movements under the stimulus of pain and pleasure is next followed out. The reproductive instinct is referred to as a modified form of hunger. There is also a theory of the origin of the brain; and another as to the origin of the differentiation between the motor and sensory nerves and their functions. The work is a brilliant one, and is studded with epigrammatic sentences, some of which have points which will be felt, but whether pleasurably or painfully will depend on the opinions of the reader. For instance; "Sociologically the money-grubber devours the services of men of brains, and the issue of the business is the development of faculties and facilities for mercantile improvement both in the sordid and mental aspects." Again: "A Chicago writer dislikes to credit any one in Arkansas with a good thought. A New York or Boston man cannot conceive of Chicago originating anything, and across the sea the general run of scientists avoid any mention of America or its workers if possible. Darwin was a notable exception to this rule, for he was above pettiness." The author has ransacked the literature of his subject, and has made a most interesting book.

The writer undervalues metaphysics, which he calls "lunar politics." Hence his identification of consciousness with chemical affinity (see above on hunger). This is a fundamental point in the science of mind in the large sense, though it may not greatly affect theories of the evolution of the human mind out of consciousness with the aid of memory and molar motion. We have already explained in this journal (1884, p. 973, on Catagenesis) and elsewhere the opposite doctrine, that consciousness is not a form of energy, but that although inseparably bound to matter and energy, it is coëqual with them. Some reasons for this view may be restated as follows:

When a form of energy is developed (as heat, light, etc.), which was not present before, we know, in accordance with the law of the conservation of energy, that the energy was already present in some other form. We thus get something out of something. We cannot hold the same view when consciousness appears where it had not been before. It is like the attempt to add beans and potatoes to get apples, etc.; in a word it is an attempt to get something out of nothing. To look upon it as a *product* of the metamorphosis of energy is like regarding a man as the product of the door which is opened in order to admit him to sight. None but a savage could entertain such an opinion. In view of the nature of the case, as well as of the truths of Kinetogenesis, so well presented by Dr. Clevenger, it is much more logical to believe that the consciousness is derived from an outside source, and is communicated to matter which is in a proper energetic state. The difficulties in the way of this view are largely if not

entirely removed by the well-known facts of *discontinuous consciousness*. There is a form of brain malady in which persons whose consciousness is clearly continuous to outside observers, lead two or more distinct conscious lives, the one of which knows nothing about the other. This is caused by the *abolition of the memory* of a part of the conscious existence. Now it is far more probable than not, that in a transfer of consciousness from one physical basis to another, the molecular structure which is the condition of memory is lost in whole or in part. Hence the absence of prenatal memory. If the mind ever learns of its forgotten life it must be by a process of exploration and unraveling of records. Such a research would be a palæontology of mind, and its materials are doubtless as abundant in the universe as are the records of the physical organisms which we now excavate from the rocks.—*E. D. C.*

A HORSE'S MEMORY.—Our sagacious little family horse—"Joe"—was kept at our place a few weeks one winter several years since, and then taken back to his owner, thirty-five miles away. Twenty-one months later I purchased him. He was led to town by the stage-driver, where I received him a mile and a half from my farm. I saddled and mounted him and told him to "go," leaving him, however, to take his own course, with a view to seeing whether he remembered the way home. Several turns were to be made in the village streets in getting out of town, but Joe made every one as correctly as he would to-day, after having traveled the same little journey daily for years. We finally crossed a bridge over Boone river, at the west end of which a gate opens into a grove, the house being forty or fifty rods off to the north. Joe stopped at the gate of his own accord, waiting for me to dismount and open it. He seemed to know every rod of the way, both to the barn and the stable, though he had been away about a year and nine months. He was a little disconcerted, however, upon going into the stable, appearing lost for a moment, but the cause of his embarrassment was sufficiently apparent from the fact that the stalls had been changed to the opposite side. It was perfectly clear, however, that he had not forgotten a single detail of his daily life during his first brief sojourn with us.—*Charles Aldrich, Webster City, Iowa, Nov. 21, 1884.*

TRAINING ELEPHANTS.—African elephants, said Forepaugh to a reporter, are more intelligent, imitative and cunning than the Asiatic. In training elephants the best method is to win them over by petting and feeding them with something nice. I always have a cake or some delicacy to give one of them when I take him out for practice, consequently the beast is always glad to see me, and is more attentive and docile than he otherwise would be. Elephants never forget anything—they recollect "their stage business" and "situation," and do not vary an inch one evening

from another in taking their positions. It requires about five months to train an elephant. We practice from 6 o'clock in the morning until 6 o'clock in the evening. They are drilled singly, and then in squads, and then taught their various "specialty" acts and tricks. Elephants are more imitative than any other animal perhaps, and are very cunning. While practicing they are looking out for an opportunity to "cut up," and will reach back and kick the trainer, and then look as innocent as a truant school-boy. They seem almost human enough to talk. The importation of elephants has increased tenfold within the past decade. Ten years ago very few circuses had more than three or four elephants, and one was the usual number; now, no circus is complete without fifteen or twenty.—*Exchange*.

THE CHIMPANZEE IN CONFINEMENT.—At the Zoölogical Gardens, Philadelphia, are two interesting individuals of this species. Although they are comparatively young, perhaps not older than six years, yet they have an extremely antiquated appearance. I heard a countryman say to a bystander that he "guessed they were 70 years old, easy." One of them has such a great fondness for an old blanket that he carries or drags it with him wherever he goes. Even if he desires to climb to the extreme top of his cage, the blanket must go along, although it greatly retards his progress. He knows its use, but does not always use it judiciously. Thus, on an oppressively hot day in July, I have seen him reclining for twenty minutes or more, entirely enveloped in the blanket, with the exception of his face, looking at the spectators with a comical and pouting expression. I saw one, when teased and disappointed by its keeper, throw itself upon the floor, and roll and scream vehemently, very like a naughty child in a tantrum. A board shelf was placed across their cage for them to climb upon. This they soon found could be used as a spring-board, and nothing seems to give them more pleasure than, when there is a good audience, to steal gently to the center of the board, grasp it tightly with all fours, and spring violently up and down, causing the board with themselves to vibrate rapidly, and producing at the same time a loud, jarring noise. They then seem to greatly enjoy the startled and amused looks of the spectators. Perhaps one of their most human actions is languidly to recline, and holding a straw in one hand, listlessly to chew at its tip, while the eyes are rolled vacantly around. It may be that they are then building "castles in Spain."—*C. F. Seiss, in Scientific American*.

ANTHROPOLOGY.¹

THE PRECURSOR OF MAN.—At the meeting of the French Association at Rouen, last year, the section of anthropology made an excursion to Thenay, near Blois, to study the question of Tertiary man. The digging was performed under the direction of

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